

Appln No.: 08/822,186
Amendment dated June 23, 2005
In Response to Office Action dated February 23, 2005

REMARKS

Claims 1, 3-6, 8, 9, 11-25, 31-33 and 35-38 are pending in this application. Claims 6, 9 and 14 are withdrawn as being drawn to nonelected species. Upon allowance of the generic claim, applicants will request rejoinder of claims 6, 9 and 14.

Applicants acknowledge with appreciation the Examiner's statement that claim 31 is in allowable form.

Applicants have amended claim 4 to recite that the binding agent has a viscosity of about 10-200 cP and a degree of substitution of 0.65-0.90. Support for this amendment is provided, e.g., on page 48, line 4 to page 49, line 9 of the specification.

Applicants have amended claims 1, 4, 32 and 35 to cancel the recitation of "non-polymeric, non-synthetic."

Applicants have amended claims 11 and 13 to improve their form.

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Applicants have amended claim 17 to add the missing parenthesis following "(w/v."

Applicants have amended claim 25 to correct an improper multiple dependency. As a result, applicants have added new claim 39. Support for new claim 39 is provided in original claim 25.

Applicants have amended claims 32 and 35 (and therefore, claims dependent therefrom) to recite that the bone morphogenetic protein is selected from the group consisting of OP1, OP2, OP3, BMP2, BMP3, BMP4, BMP5, BMP6, BMP9, BMP10, BMP11, BMP12, BMP15, BMP16, DPP, Vgl, 60A protein, GDF-1, GDF3, GDF5, GDF6, GDF7, GDF8, GDF9, GDF10 and GDF11. Support for this amendment is provided, e.g., on specification page 1, lines 15-24 and page 22, lines 13-17.

None of the amendments introduces new matter.

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THE OBJECTIONS

Claims 17-19 and 25

The Examiner has objected to claims 17-19 and 25 because there is a missing parenthesis and/or a misplaced period after "(w/v".

Applicants have amended claim 17 (and therefore, claims 18, 19 and 25) to add the missing parenthesis. Accordingly, applicants request that the Examiner withdraw this objection.

THE REJECTIONS

35 U.S.C. § 103(a)

Claim 4

The Examiner has rejected claim 4 under 35 U.S.C. § 103(a) as being obvious over Cook (Cook et al., "Recombinant Human Bone Morphogenetic Protein-7 Induces Healing in a Canine Long-Bone Segmental Defect Model," *Clin. Ortho. Rel. Res.* 301: 302-312 (1994)) ("Cook") in view of Sato (Sato et al., "Bone morphogenesis of rabbit bone morphogenetic protein-bound hydroxyapatite-fibrin composite," *Clin. Orthop.* 263: 254-262

(1991) ("Sato") and WO 94/15653 ("Ammann"). The Examiner states that Cook discloses a composite comprising a collagen carrier and rhOP-1 for the healing of segmental defects and that the composite of carrier and protein was an amorphous material with the consistency of wet sand. The Examiner also states that Sato discloses that enhancing the plasticity of granular deposits can facilitate the filling of bone defect, increase the rate of bone ingrowth, thus, making it easier to inject into a bone defect and thereby, shortening surgery and decreasing bleeding and that Ammann discloses that a polymer for enhancing consistency of the formulation may be any polysaccharide or insoluble protein material useful for binding TGF- β to TCP to form a smooth, moldable putty or paste. The Examiner states that although Sato and Ammann do not teach a device comprising rhOP-1, collagen and CMC, it would have been obvious to one of ordinary skill in the art to make an amorphous composite with the consistency of wet sand comprising collagen and rhOP-1, as taught by Cook, and to modify that teaching by adding CMC, as taught by Ammann, with a reasonable expectation of success. The Examiner further states that one of ordinary skill in the art would be motivated to make

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this modification with a reasonable expectation that enhancing the consistency of a composite by making a smooth, moldable putty or paste would fill in bone gaps where needed, improve application to the desired bone defect site, make the composite easier to handle and lessen the difficulty of filling bone defects homogenously with granular deposits.

Applicants have amended claim 4 to recite that the binding agent has a degree of substitution of 0.65-0.90 and a viscosity of about 10-200 cP at a 4% (w/v) concentration of said binding agent.

Cook teaches the use of OP-1 in a bovine bone collagen carrier to induce bone formation in a segmental defect model. Cook does not teach or suggest a binding agent having a degree of substitution of 0.65-0.90 and a viscosity of about 10-200 cP at a 4% (w/v) concentration, as recited in the amended claim. Neither Sato nor Ammann remedy this deficiency. Ammann discloses a bone-inducing formulation comprising TGF- β and TCP and optionally, a polymer for enhancing consistency of the formulation useful for binding the TGF- β to the TCP to form a smooth, moldable putty or

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paste. Sato discloses a device comprising hydroxyapatite, fibrin and insoluble noncollagenous protein with BMP (BMP-iNCP).

Accordingly, based on the teachings of Cook, Ammann and Sato, the skilled worker would not have been motivated to prepare a device wherein the binding agent has a viscosity of about 10-200 cP and a degree of substitution of 0.65-0.90. Accordingly, applicants request that the Examiner withdraw this obviousness rejection.

35 U.S.C. § 112, second paragraph

Claims 1, 3, 5, 8, 11-13, 15, 16, 20-24, 32, 33 and 35-38

The Examiner has rejected claims 1, 3, 5, 8, 11-13, 15, 16, 20-24, 32, 33, 35-38 under 35 U.S.C. § 112, second paragraph as being indefinite. The Examiner states that the term "non-polymeric, non-synthetic" matrix is indefinite because the specification does not identify that material element or combination of elements which is unique to, and therefore, definitive of "non-polymeric, non-synthetic" matrix such that one of skill in the art cannot determine what additional or material limitations are placed upon a claim by the presence of this element.

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Applicants have canceled the recitation of "non-polymeric, non-synthetic" matrix from claims 1, 32 and 35 (and therefore, claims dependent therefrom), thereby obviating the Examiner's rejection.

Claims 32, 33, 35 and 36

The Examiner has rejected claims 32, 33, 35 and 36 under 35 U.S.C. § 112, second paragraph as being indefinite. The Examiner states that the terms "bone morphogenic protein" and "BMP" embraces but are not limited to the class of proteins typified by human osteogenic protein and that the specification does not identify that material element or combination of elements which is unique to, and therefore, definitive of "bone morphogenic protein."

Applicants have amended claims 32 and 35 (and therefore claims dependent therefrom) to recite that the bone morphogenetic protein is selected from the group consisting of OP1, OP2, OP3, BMP2, BMP3, BMP4, BMP5, BMP6, BMP9, BMP10, BMP11, BMP12, BMP15, BMP16, DPP, Vgl, 60A protein, GDF-1, GDF3, GDF5, GDF6, GDF7,

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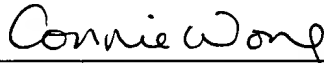
GDF8, GDF9, GDF10 and GDF11, thereby obviating the Examiner's rejection.

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CONCLUSION

In view of the foregoing remarks and amendments, applicants request that the Examiner favorably reconsider this application and allow the claims pending herein. If the Examiner believes that a telephone conference would expedite allowance of this application, he is invited to telephone the undersigned at any time.

Respectfully submitted,



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